Back to results | 1 of 1

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Effect of gold nanoparticles and electrode dryingtime on reduced graphene oxide-based compositewith respect topeak current of cyclic voltammetry (Article)

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Abstract

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Screen-printed glassy carbon electrodes (GCEs) 2 mm in diameter deposited with composites of reduced graphene oxide- gold nanoparticles (rGO-AuNPs), reduced graphene oxide-cellulose (rGO-cellulose), and reduced graphene oxide- gold nanoparticles -cellulose (rGO-AuNPs-cellulose) were characterized in terms of the effect of drying time on the peak oxidative current and surface roughness. From the cyclic voltammetry (CV) graph, at 12 hrs of electrode drying time in ambient airtherGO-AuNPs/GCE showed the highest anodic peak current of 1252.82 μA, in comparison to therGOcellulose/ GCE with the lowest at 24.64 μA. FESEM results show that the rGO-AuNPs composite has the roughest surface morphology as well. Furthermore, there seem to be two layers of surface morphology in cellulose-based samples. The results obtained suggest that rGO-AuNPs/GCEs with 12 hours drying time have the highest peak current and the largest surface area owing to its roughness, thus implying that rGO-AuNPs has the most electrode area involved in redox reactions. The results also suggest the rGO-AuNPs nanocomposite can be effective as a sensitive transducer material for an electrochemical biosensor. © 2006-2018 Asian Research Publishing Network (ARPN).

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